# THE INTEGRATION OF GLIDEINWMS WITH GLOBUSONLINE.ORG

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# Overview

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# Introduction

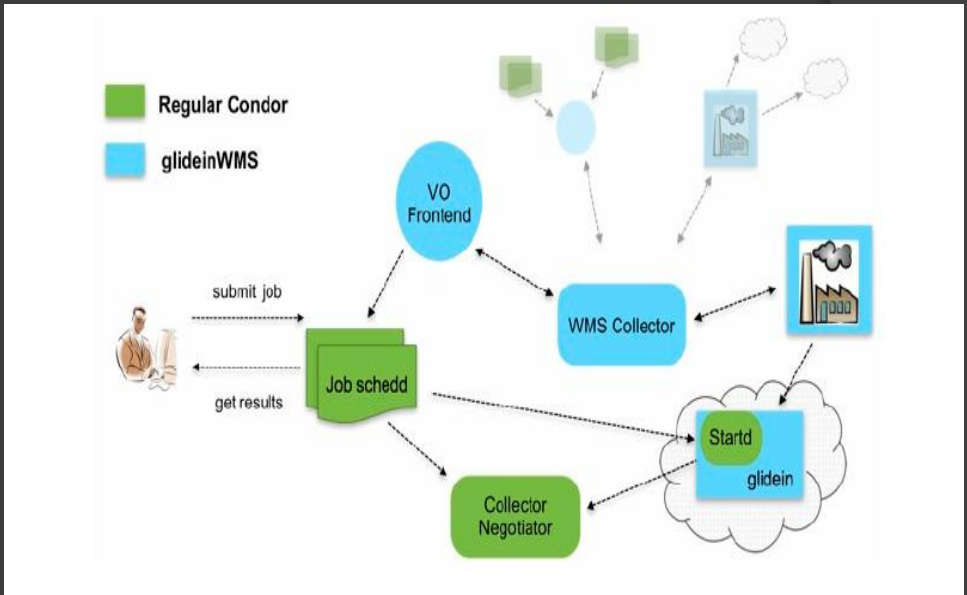
- CEDPS: The five year project started in 2006, funded by Department of Energy (DOE)
- Goals
  - Produce technical innovations for rapid and dependable **data placement** within a distributed high performance environment and for the construction of **scalable science services** for data and computing from many clients.
  - Address performance and functionality troubleshooting of these and other related distributed activities.
- Collaborative Research
  - Mathematics & Computer Science Division, Argonne National Laboratory
  - Computing Division, Fermi National Accelerator Laboratory
  - Lawrence Berkeley National Laboratory
  - Information Sciences Institute, University of Southern California
  - Dept of Computer Science, University of Wisconsin Madison

# CEDPS Activities at FNAL

- Investigating data movement mechanisms for data stage-out on Grids
  - globusonline.org needs integration with SRM interface for OSG
- Supporting the integration of data movement mechanisms with scientific DH frameworks
  - Supporting the integration of globusonline.org with Dark Energy Survey (DES) data handling system
- Integration of asynchronous data stage-out mechanisms in overlay workload management systems (…this talk…)
  - Release resources at job termination. Delegate data stage-out to external agents.
  - Integrate support for globusonline.org into glideinWMS

# glideinWMS

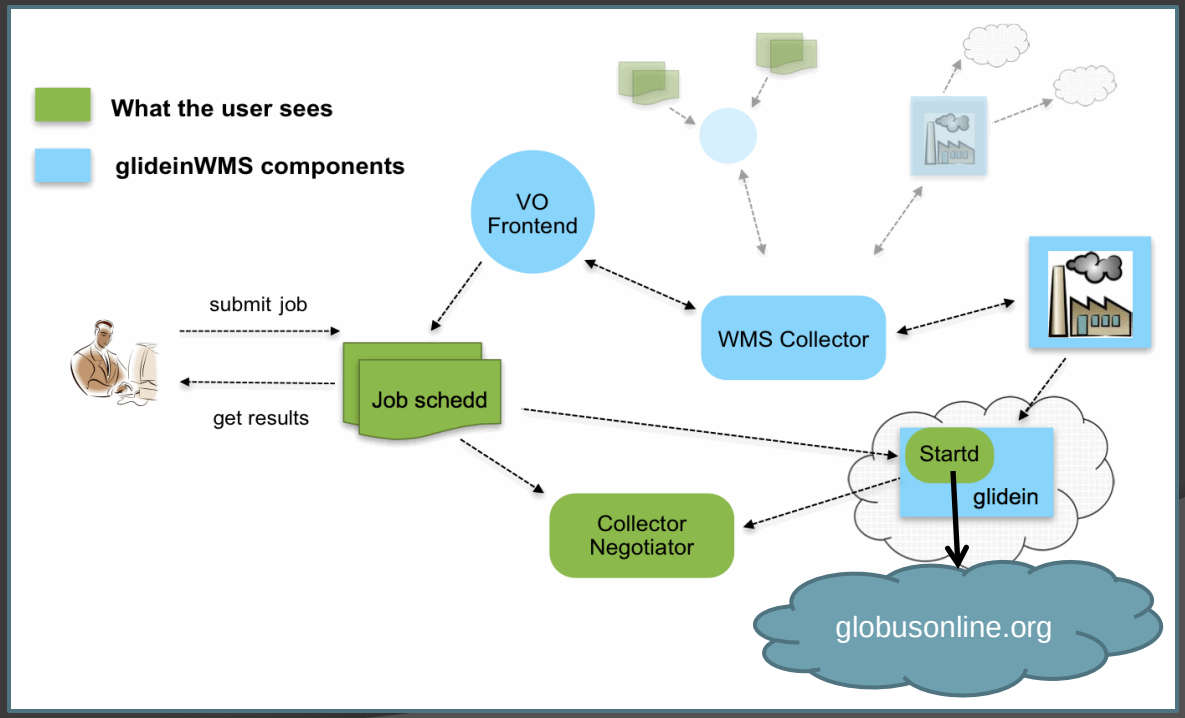
- Pilot-based WMS that creates on demand a dynamically-sized overlay condor batch system on Grid resources to address the complex needs of VOs in running application workflows
- Components
  - WMS Collector
  - Glidein Factory
  - User Pool Collector
  - User Scheduler
  - VO Frontend




- Factory knows about the sites and how to submit glideins to the sites
- VO frontend knows about the user job details
- WMS Collector acts as a dashboard for Factory - VO Frontend communication.

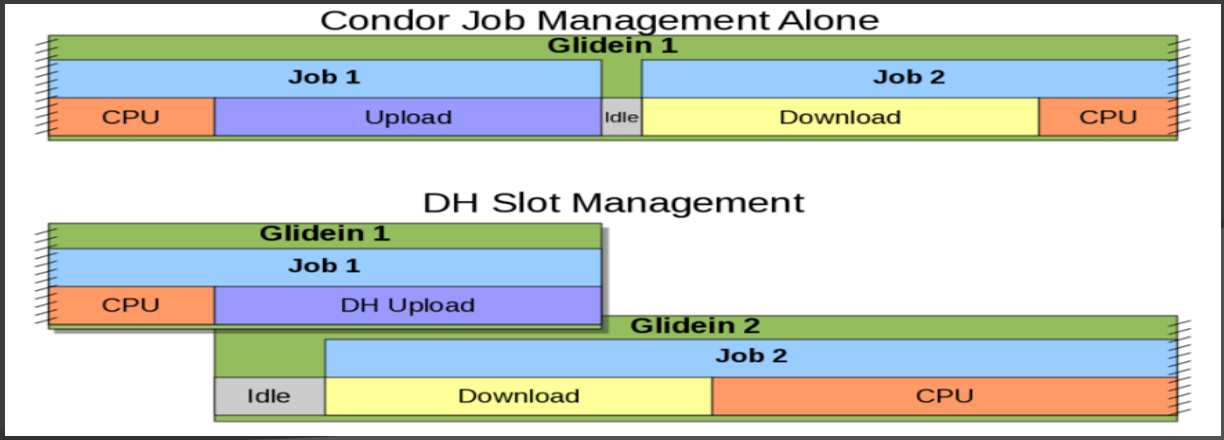
# Interfacing glideinWMS with globusonline.org

- glideinWMS is the workload management system for user jobs
- globusonline.org services are responsible for data management
- glideinWMS interfaces with the globusonline.org services through condor's globusonline.org transfer plug-in
  - Work done in collaboration with the Condor team



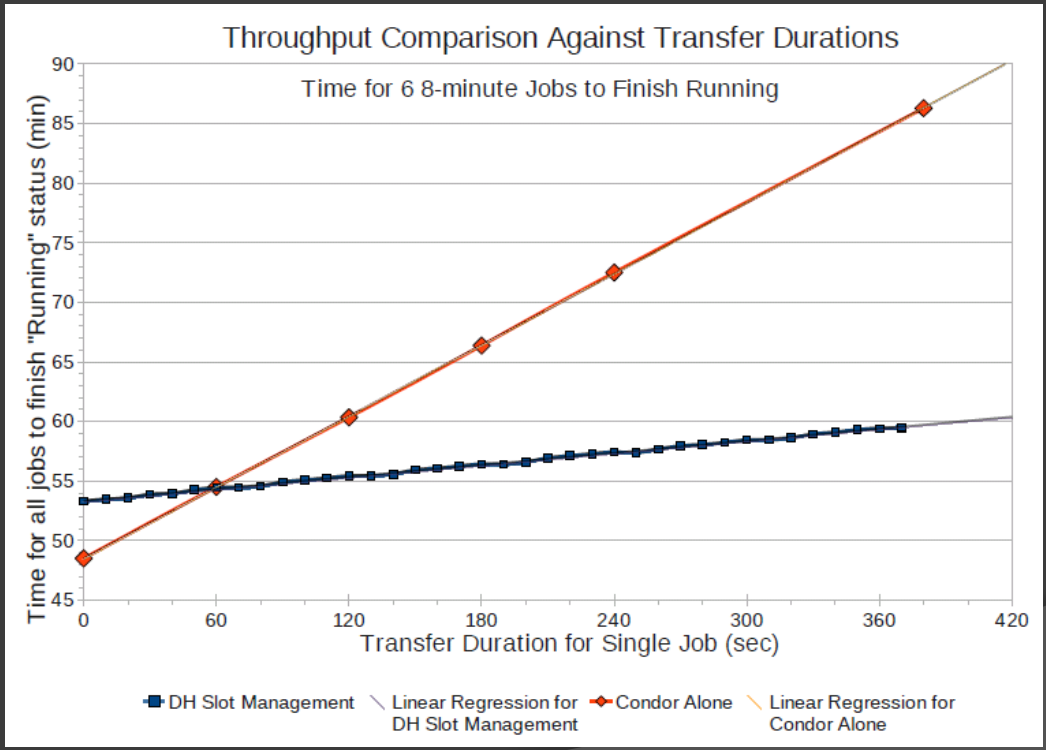
# Asynchronous Sandbox Management

- Enhance glideinWMS by
  - Increasing the CPU utilization of Condor-managed resources in a wide area environment through CPU and network I/O overlap enabled by asynchronous transfers of sandboxes – Miron Livny
- What does this mean?
  - Pipeline the transfer of asynchronous sandboxes in Condor using globusonline.org
  - Multiple transfers can take place via transfer slots
  - New job can start running if the previous job has entered stage-out state
  - Reattempt failed transfers as needed
  - Support multiple transfer protocols using transfer Plug-ins



# First Prototype: Condor Hooks

- Support at the Application Layer implemented by Evan Boldt.
- Use Condor Hooks
  - To identify end of CPU stage
  - Initiate the output sandbox transfer
- Start another condor_startd to accept new job



# Asynchronous Sandbox Management in Condor

- Rather than the application, let condor transfer the output sandboxes asynchronously
  - Generic
  - Robust
  - Reliable
  - Scalable
- Collaborative Effort
  - Condor team working on output sandbox management
  - Fermi team is implementing the Sandbox Manager
    - A repository for sandboxes
    - Condor_startd interfaces with the sandbox manager to keep track of output sandboxes

# Ongoing & Future Work

- Sandbox Manager & condor
  - **Milestone 1 (3/11):** Startd maintains the slot manager
    - Interface the sandbox manager with the condor_startd
  - **Milestone 2 (3/24): Bind CPU slot to data slot**
    - Introduce the concept of the data slot
  - **Milestone 3 (4/25): Handle sandbox transfer semantics**
    - Make scheduler aware of the new sandbox transfer semantics
  - **Milestone 4+: Improve scalability & robustness**
- Provide an end-to-end solution for VO applications
  - Involve potential Virtual Organizations (VOs) like Intensity Frontiers (IF) and any VO interested in end-to-end solution
  - Possible deployment on OSG Integration testbed for new VOs
- Testing sandbox manager and integration with glideinWMS
  - Summer student

# Acknowledgments


- The work is being done as a part of the CEDPS project
- The GlideinWMS project was developed and is supported by Fermilab Computing Divison and the CMS Experiment
- This work is an ongoing collaboration with the Condor team at University of Wisconsin-Madison
- Currently used in production by CMS, CDF and DZero, MINOS, ICECube with several other VO's evaluating it for their use case.
- Fermilab is operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.
- The Open Science Grid (OSG) collaborates with CEDPS for solutions on data movement and stage-out